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(54) **DELAY SYSTEM FOR A STIRRING MACHINE**

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B01F 3/18	(2006.01)
B01F 7/30	(2006.01)
B01F 13/04	(2006.01)
F26B 9/08	(2006.01)

(52) **U.S. Cl.**

CPC ***B01F 3/18*** (2013.01); ***B01F 7/302*** (2013.01); ***B01F 13/045*** (2013.01); ***F26B 9/085*** (2013.01); *B01F 2215/0013* (2013.01)

(58) **Field of Classification Search**

CPC B01F 7/302; B01F 13/045; B01F 13/047; A01F 25/00; A01F 25/22; F26B 9/085

See application file for complete search history.

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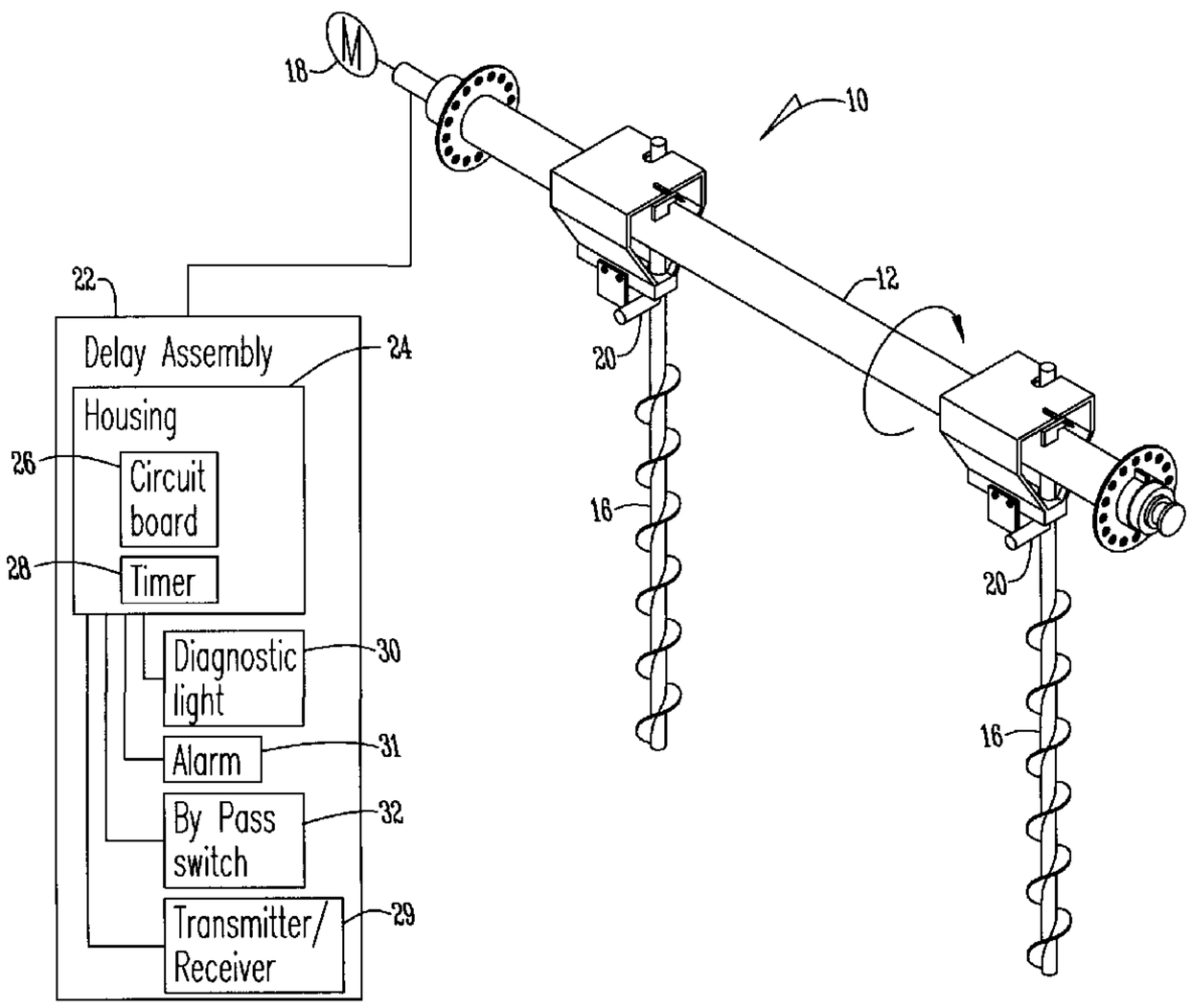
(57) **ABSTRACT**

A delay system for a stirring machine includes a plurality of vertical stirring augers, supported to a cross tube, with each auger having a tilt switch. A gear motor is connected to the cross tube and moves the cross tube forwardly around a bin. A delay assembly is connected to the tilt switches and the gear motor. The delay assembly shuts off the gear motor when the stirring augers are vertically displaced and starts the gear motor after a time delay once the stirring augers return to a vertical position.

9 Claims, 4 Drawing Sheets



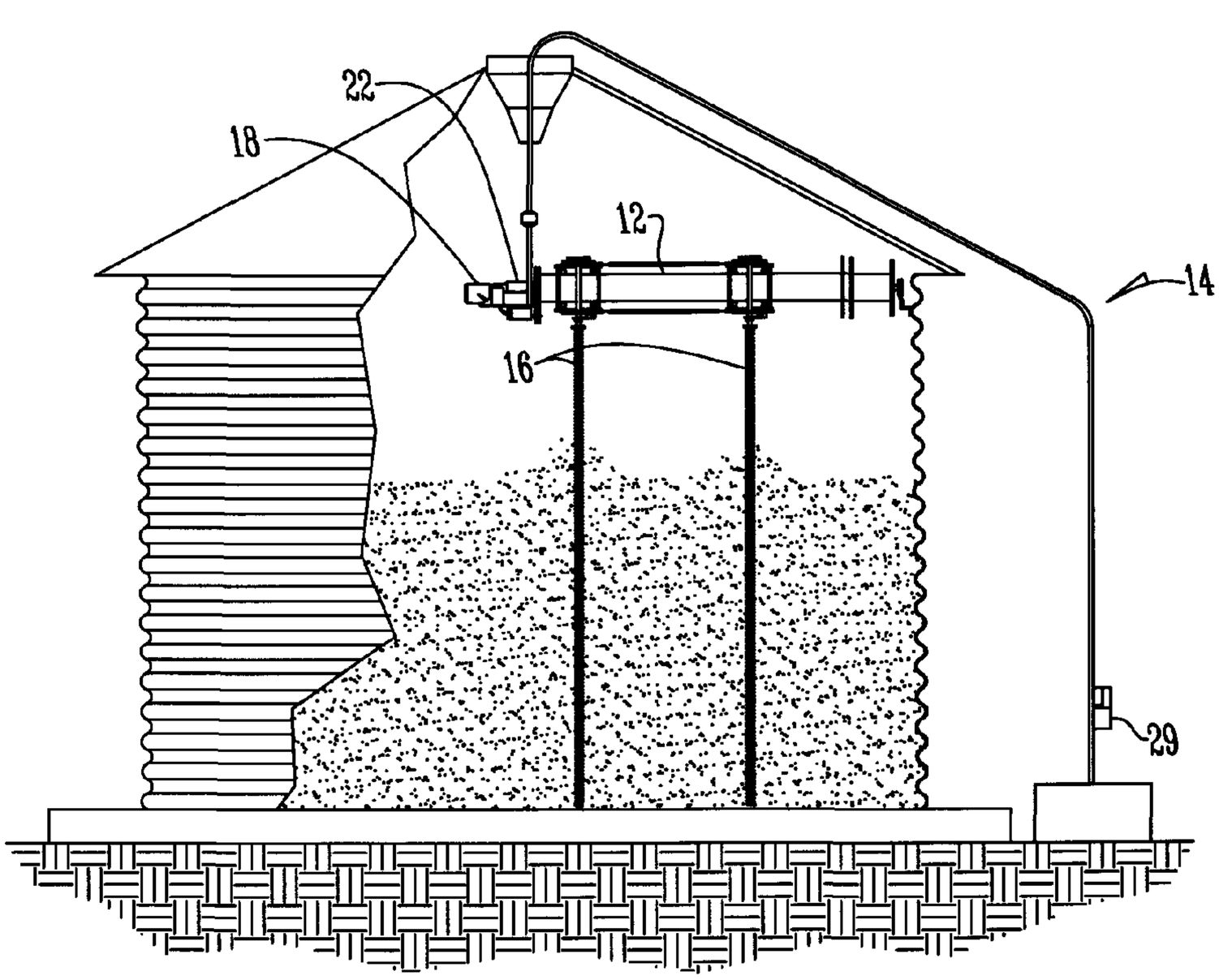


Fig. 1

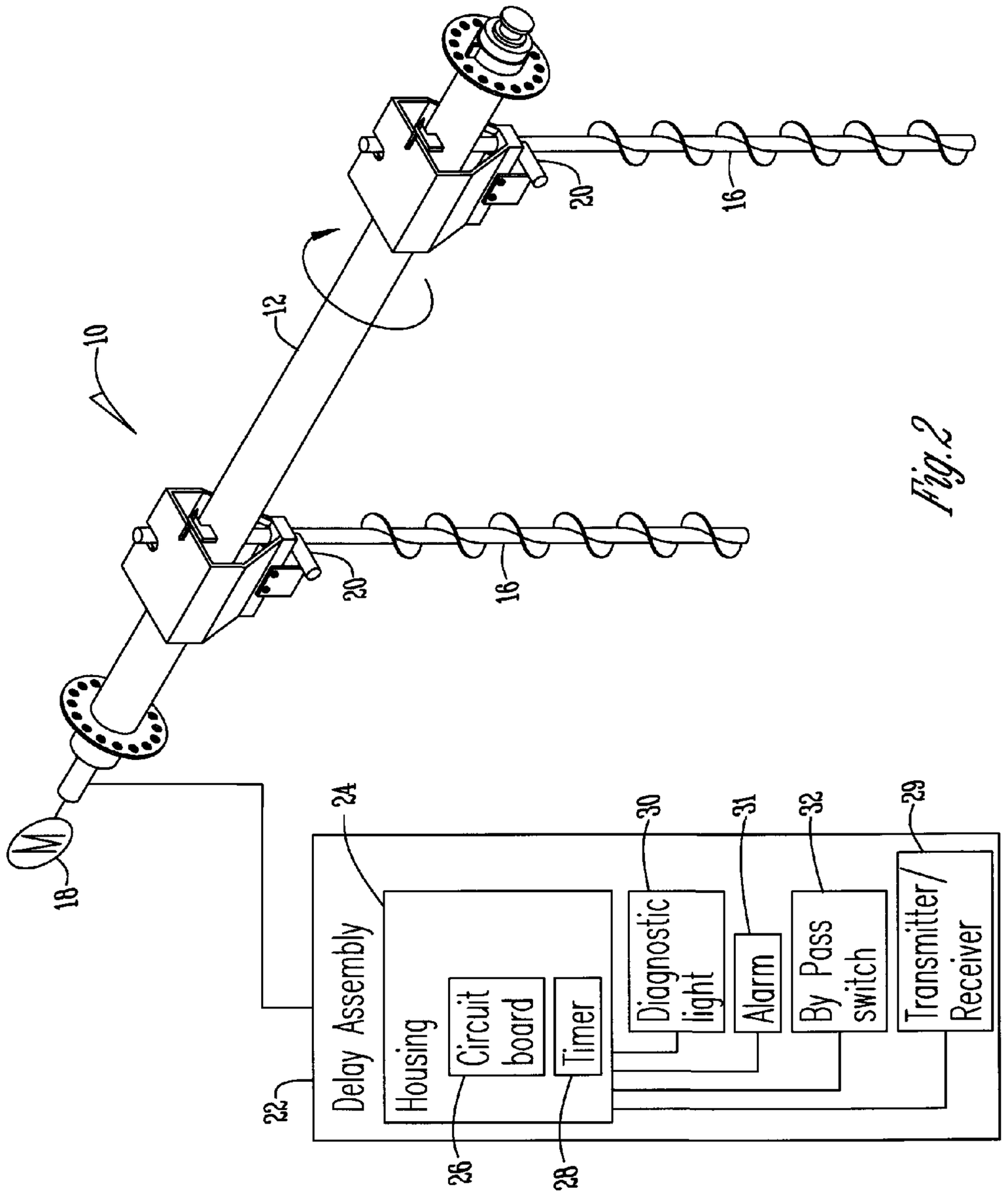

10
12
16
18
20
22
24
26
28
29
30
31
32
Delay Assembly
Housing
Circuit board
Timer
Diagnostic light
Alarm
By Pass switch
Transmitter/ Receiver
M

Fig.2

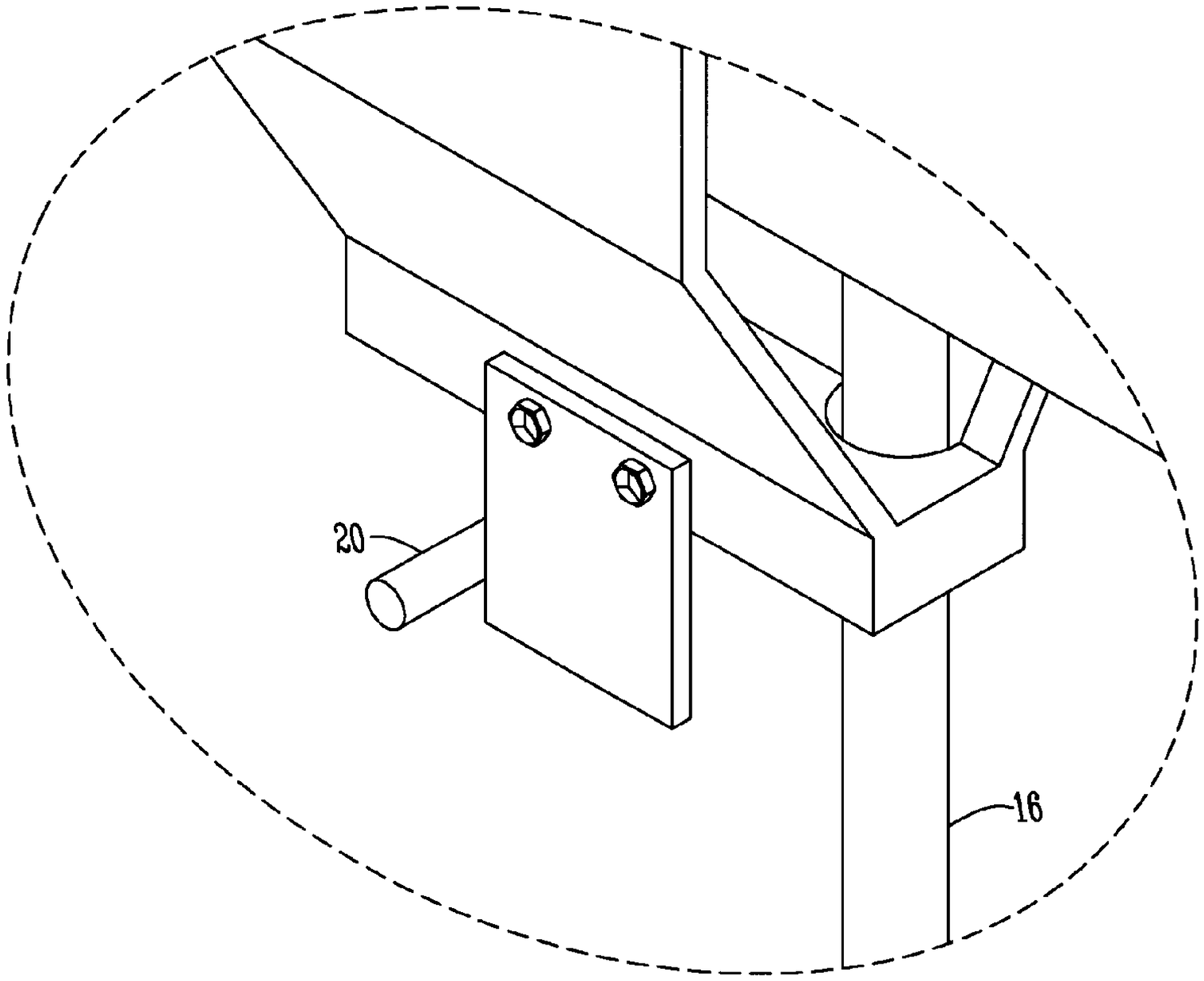


Fig. 3

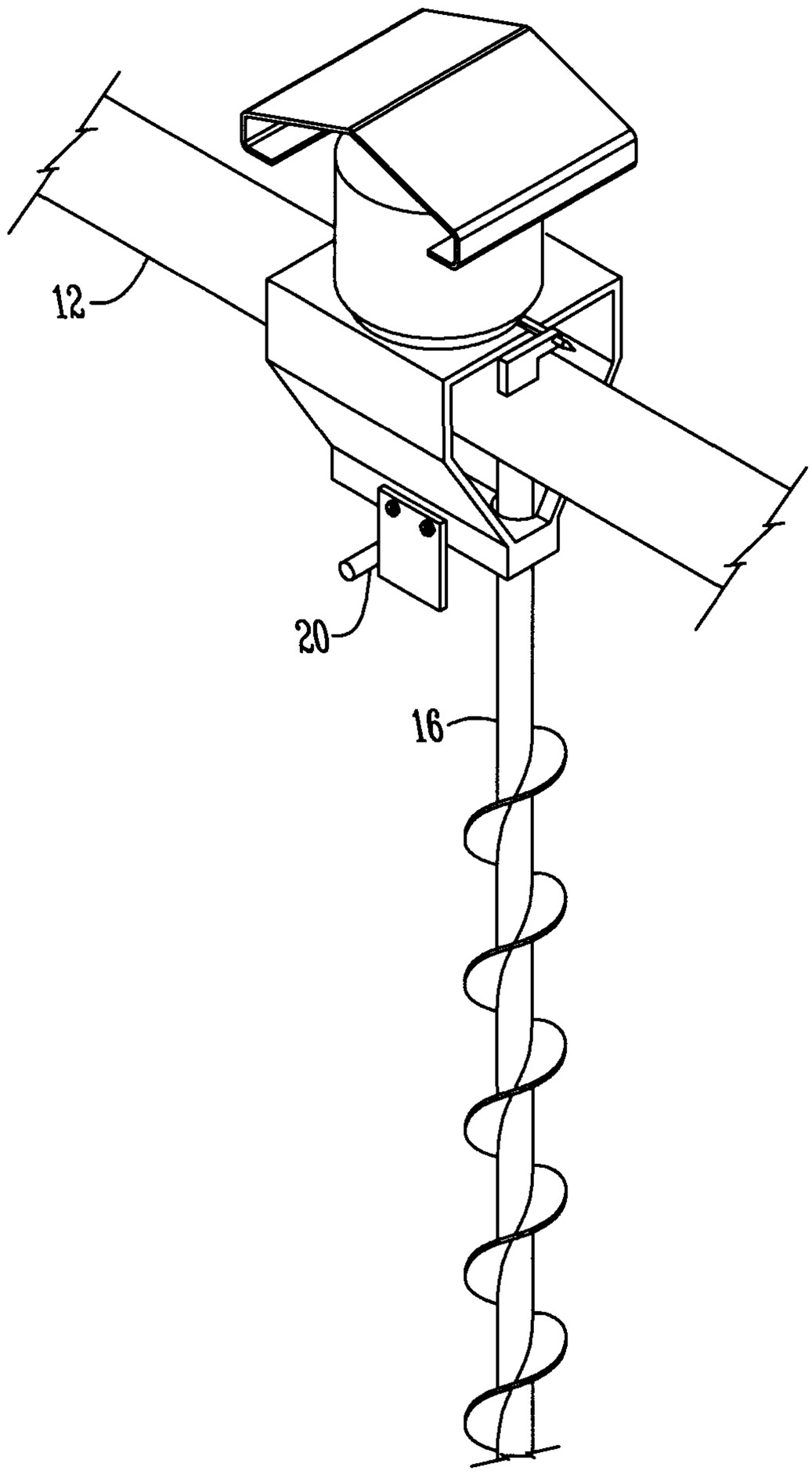


Fig. 4

DELAY SYSTEM FOR A STIRRING MACHINE

BACKGROUND OF THE INVENTION

The invention is directed to a delay system for a stirring machine and more particularly to a system that delays forward movement of a cross tube of a stirring machine after stirring augers have returned to a generally vertical position.

Stirring machines for grain bins are well known in the art. Presently, a tilt switch mounted on a vertical auger on a stirring machine shuts off the forward movement of the stirring auger when the stirring auger lags too far behind. This allows the vertical auger to catch up to a more vertical position at which time the gear motor is actuated to start the forward movement of the cross tube.

In tough and wet drying situations, once the stirring augers return to a more vertical position, they may quickly encounter dense grain and be displaced causing another shut down. When the stirring auger remains vertical momentarily, it is better able to clear the dense grain leading to more efficient movement in high moisture and difficult drying situations and fewer shut downs. Thus, a system is needed in the art for a device that addresses these deficiencies.

An objective of the present invention is to provide a delay system for a stirring machine that improves the stirring efficiency.

Another objective of the present invention is to provide a delay system for a stirring machine to improve performance of the stirring augers in high moisture and difficult drying situations.

These and other objectives will be apparent to one of ordinary skill in the art based upon the following written description, drawings, and claims.

SUMMARY OF THE INVENTION

A delay system for a stirring machine includes a plurality of vertical stirring augers, supported on a cross tube, with each auger having a tilt switch. A gear motor is connected to the cross tube and moves the cross tube forwardly around a bin. A delay assembly is connected to the tilt switches and the gear motor. The delay assembly shuts off the gear motor when the stirring augers are vertically displaced and starts the gear motor after a time delay once the stirring augers return to a vertical position.

BRIEF DESCRIPTION OF THE FIGURE

FIG. **1** is a side sectional view of a stirring machine in a grain bin;

FIG. **2** is a perspective view of a stirring machine;

FIG. **3** is a perspective view of a tilt switch assembly; and

FIG. **4** is a perspective view of a stirring machine.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the Figures, a stirring machine **10** includes a laterally extending support or cross tube **12**, which normally extends radially of a bin **14** in which it is mounted. A plurality of downwardly extending stirring augers **16** are supported by the cross tube **12** and are operatively connected to a gear motor **18**. A tilt switch **20** is connected to each auger **16** for detecting when the downward auger **16** lags too far behind the cross tube **12**. The tilt switch **20** is electrically connected to a delay assembly **22**.

The delay assembly **22** includes a housing **24** that encloses a circuit board **26** and a timer **28**. The assembly may also include a transmitter/receiver **29**, a diagnostic light **30**, an alarm **31** and a by-pass or override switch **32**. The transmitter/receiver **29** may be attached to an outer portion of the bin **14**, have a transmitter/receiver **29** and be electrically or wirelessly connected to the circuit board **26**. The gear motor **18** is also connected to the delay assembly **22**.

In operation, the gear motor **18** drives the cross tube **12** around the bin **14** which in turn drives the augers **16** around the bin **14** and laterally on the cross tube **12**. Periodically, as the augers **16** encounter wet and heavy grain, the auger **16** will tilt and lag behind the cross tube **12**. When this occurs, the tilt switch **20** detects a vertical displacement of the auger **16** and sends a signal to the circuit board **26** of the delay assembly **22**. The circuit board **26** then sends a signal to the gear motor **18** which shuts off forward movement of the cross tube **12**. Shutting off forward movement of the cross tube **12** allows the stirring augers **16** to catch up and return to a more vertical position. If the stirring augers **16** do not return to a vertical position within an adjustable predetermined time, the circuit board **26** sends a signal activating the alarm **31** and may also shut off the stirring auger **16**. The alarm **31** may be wirelessly connected to a remote device such as an operator's phone.

When the stirring auger **16** returns to a near vertical position, the tilt switch sends a signal to the circuit board **26** which in turn sends a signal to the timer **28** which delays forward movement of the cross tube **12**. After an adjustable, predetermined time has elapsed, a signal is sent to the gear motor **18** from the timer **28** and forward movement of the cross tube **12** is restored.

Alternatively, when the auger **16** tilts and lags behind the cross tube **12**, the tilt switch **20** sends a signal to the circuit board **26**, which sends a signal to the timer **28**. The timer **28** shuts off power to the gear motor **18** for a predetermined amount of time. Once the predetermined amount of time expires, so long as the auger **16** has returned to a near vertical position, power is returned to the gear motor **18**. If not, either a signal is sent to the alarm **31** or the predetermined time delay is reset.

Thus a delay assembly for a stirring machine has been disclosed that, at the very least meets all the stated objectives.

What is claimed is:

1. A delay system for a stirring machine comprising:

a plurality of stirring augers supported by a cross tube and having a tilt switch;

a gear motor connected to the cross tube; and

a delay assembly connected to the gear motor and the tilt switch, wherein the delay assembly is configured to delay forward movement of the cross tube after the stirring augers have returned to a near vertical position.

2. The delay system of claim **1** wherein the tilt switch is configured to send a signal to the delay assembly when the tilt switch detects a vertical displacement of the stirring auger such that forward movement of the cross tube is stopped.

3. The system of claim **1** wherein the delay assembly includes a circuit board and a timer within a housing.

4. The system of claim **3** wherein at least one diagnostic light and an override switch are attached to an outer surface of the housing and connected to the circuit board.

5. The system of claim **1** further comprising the delay assembly having an alarm, wherein the alarm is configured

to activate if the stirring auger does not return to a near vertical position within an adjustable predetermined amount of time.

6. The system of claim **1** wherein the tilt switch sends a signal to a timer that shuts off power to the gear motor for a predetermined amount of time.

7. The system of claim **1** wherein the delay assembly is wirelessly connected to the gear motor and tilt switch.

8. The system of claim **1** wherein the delay assembly is configured to shut off power to the stirring augers after a predetermined amount of time.

9. A delay system for a stirring machine comprising:

a plurality of stirring augers supported by a cross tube and having a tilt switch;

a gear motor connected to the cross tube;

a delay assembly connected to the gear motor and the tilt switch;

wherein the tilt switch is configured to send a signal to the delay assembly when the tilt switch detects a vertical displacement of the stirring auger such that forward movement of the cross tube is stopped; and

wherein the delay assembly is configured to shut off power to the stirring augers if the stirring auger does not return to a near vertical position within an adjustable predetermined amount of time.

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